CBO TESTIMONY

Statement of
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The Navy's DD(X) Destroyer Program

before the
Subcommittee on Projection Forces
Committee on Armed Services
U.S. House of Representatives

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Mr. Chairman, Congressman Taylor, and Members of the Subcommittee, I appreciate the opportunity to appear before you today to discuss the DD(X) destroyer program. Specifically, the Subcommittee asked the Congressional Budget Office (CBO) to compare the actual costs of the DDG-51 destroyer program with those estimated for the DD(X) program, to discuss the realism of cost estimates for the DD(X), and to examine the affordability of the DD(X) in the context of the Navy's ship construction budget. CBO's ongoing analysis of the Navy's shipbuilding programs in general and the DD(X) program in particular indicates the following:

- The lead ship of the DDG-51 Arleigh Burke class of destroyers was more expensive, in terms of cost per ton of light-load displacement, than the Navy's current estimate of the cost of the lead DD(X), suggesting that additional cost growth is possible in the DD(X) program.

- The 35-year life-cycle costs of a DD(X) are likely to be higher than those of a recently purchased DDG-51 on a net-present-value basis (see Table 1).

- The first DD(X) would consume 19 percent of the Navy's ship construction budget in the year it was built, compared with 11 percent for the first DDG-51 in 1985.[1]

The DD(X) Destroyer Program

The DD(X) is being designed as a multimission surface combatant that would have a full-load displacement (its weight when carrying a full complement of crew, cargo, fuel, and water) of about 14,000 tons. The ship's capabilities are centered on providing fire support for forces on shore using two 155 millimeter Advanced Gun Systems and 80 missile tubes that could carry Tomahawk cruise missiles or other weapons. According to the Navy, the DD(X) will be more capable than existing cruisers and destroyers against threats found in littoral regions, such as diesel-electric submarines, mines, swarming small boats, and cruise missiles.

Over the past several years, the Navy has changed its planned acquisition of DD(X) destroyers. The original DD-21 program—on which the DD(X) is substantially based—called for a class of 32 ships. In early 2003, the Navy released its Global Concept of Operations, which envisioned buying only 16 DD(X)s. In May 2003, however, the Navy sent a report to the Congress specifying its 30-year ship construction requirements. That report called for a 375-ship Navy, including 24 DD(X)s. In March 2005, the Navy sent a revised 30-year plan to the Congress

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1. If all of the resources budgeted for the lead DD(X)—$3.3 billion—were included and compared with the total 2007 shipbuilding budget, that ship would consume 26 percent. However, about $900 million for the lead DD(X) is budgeted for 2005 and 2006. The 19 percent figure above includes only the amount budgeted for that ship in 2007 (about $2.4 billion).

Table 1.

Comparison of the DDG-51 and DD(X) Destroyers

	DDG-51	DD(X)
Procurement Cost for the Lead Ship of the Class (Billions of 2007 dollars)		
Navy's estimate	2.6	3.3
CBO's estimate	2.6	4.7
Displacement (Thousands of long tons)		
Light load	6.6	12.1
Full load	8.3	14.3
Procurement Cost per Thousand Long Tons for the Lead Ship of the Class (Millions of 2007 dollars)		
Navy's estimate	385	275[a]
CBO's estimate	385	385[a]
Annual Operating Costs per Ship (Millions of 2007 dollars)	34	22 to 32
Life-Cycle Costs per Ship (Billions of 2007 dollars)[b]		
Using the Navy's estimate for DD(X) procurement	2.1	2.7 to 2.9
Using CBO's estimate for DD(X) procurement	2.1	3.8 to 4.0

Source: Congressional Budget Office.

a. This number is the same as CBO's estimate for the DDG-51 because it is based on a direct analogy to that ship.

b. Life-cycle costs are shown on a discounted (net-present-value) basis.

that envisioned a fleet of 260 to 325 ships, including eight to 12 DD(X)s. The program of record submitted with the President's 2006 budget included 10 DD(X)s, pending the Navy's determination of the composition of its future fleet. According to that program, the lead ship of the DD(X) class would be procured in 2007.

Comparing Construction Costs for the DDG-51 and DD(X)

Comparing the cost of the lead ship of the DDG-51 Arleigh Burke class with the cost of the lead DD(X) depends critically on the inflator used to convert 1985 dollars to 2007 dollars. According to information in Department of Defense (DoD) cost reports, the lead ship of the DDG-51 class, begun in 1985, cost approximately $1.2 billion to build. Using DoD's inflator for overall military procurement to convert that amount to 2007 dollars results in a cost of $2.0 billion to

construct the first DDG-51. However, the Assistant Secretary of the Navy for Research, Development, and Acquisition, John Young, has stated that if the first DDG-51 were bought now, it would cost $2.4 billion (20 percent more than DoD's overall procurement inflator would indicate).[2]

According to analysis of the inflationary component of past cost increases in shipbuilding programs that was conducted by the Navy and shared with CBO, DoD's overall procurement inflator underestimates the inflation that has actually occurred in the naval shipbuilding industry. On the basis of that analysis, the Navy provided CBO with a composite inflator that reflects the growth in labor and material costs that the naval shipbuilding industry has experienced in the past and expects to experience through 2011. Using that inflator, CBO calculates that the lead DDG-51 cost almost $2.6 billion in 2007 dollars (see Table 1).

According to the latest information available to CBO, the Navy estimates that the lead ship of the DD(X) program would cost $3.3 billion. (Information provided by the Navy suggests that the service's estimate of that cost grew by about 25 percent between the President's 2004 and 2006 budgets.) Using the Navy's current estimate for the lead ship and historical relationships about how the cost per ship declines as more are built, CBO estimates that the DD(X) would cost an average of $2.4 billion apiece for a 10-ship program.

However, recent press reports indicate that the Cost Analysis Improvement Group (CAIG) in the Office of the Secretary of Defense believes that procurement costs for the DD(X) program may be 33 percent higher than the Navy estimates.[3] If those reports are accurate, the first DD(X) could cost a total of $4.4 billion, implying an average cost of $3.2 billion for a 10-ship program. (As shown in Table 2, the Navy's cost goals and estimates for the DD(X) program and its predecessor, the DD-21, have increased several times since 1996.)

CBO employed a top-level approach to bound the potential cost of the lead DD(X). (Our experience indicates that such an approach can provide a good indication of a program's possible costs.) CBO calculated a metric of cost per long tons, measured in terms of a ship's light-load displacement (when carrying no fuel, crew, cargo, or water), based on the lead DDG-51. That first DDG-51 weighed 6,624 long tons and cost a total of $2.6 billion in 2007 dollars, or $385 million per thousand tons. The Navy now expects the DD(X) to have a light-load

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2. John Young, "Keep DD(X) on Track: Destroyer Builds Foundation for Future Navy," *Defense News* (June 13, 2005).

3. See Chris Cavas, "Rising Costs of DD(X) Threaten U.S. Fleet Plans," *Defense News* (May 2, 2005); Tony Capaccio, "Destroyer May Cost 33% More Than Navy Budgeted, Pentagon Says," *Bloomberg.Net* (May 2, 2005); and Christopher J. Castelli, "Pentagon Postpones DD(X) DAB Meeting to Resolve Cost Estimates," *Inside the Navy* (May 2, 2005).

Table 2.

Cost Estimates Over Time for the Fifth Ship of the DD-21/DD(X) Destroyer Program

	Billions of 2007 Dollars
1996 (DD-21 cost goals)	
Objective goal	1.06
Threshold goal	1.23
2004 Future Years Defense Program	1.4
2005 Navy Estimate	2.0/2.4[a]
2005 CBO Estimate	3.4

Source: Congressional Budget Office.

a. The figure of $2.0 billion is the Navy's cost estimate for the fifth DD(X) contained in the 2006 Future Years Defense Program. That ship would be purchased in 2011, as would the first of the Navy's new class of cruisers, the CG(X), which would use the hull design of the DD(X). The figure of $2.4 billion is CBO's estimate of the cost of the fifth DD(X), based on the Navy's cost estimates, in the event that the first CG(X) is purchased after 2011.

displacement of 12,135 long tons. Based on the Navy's estimate of $3.3 billion, the lead DD(X) would cost $275 million per thousand tons, or about 29 percent less than the first DDG-51.

The Navy states that specific problems that were encountered in constructing the first DDG-51 are unlikely to be repeated in building the DD(X). Moreover, the Navy says, advances in ship construction techniques or management may make building a lead ship less costly today than it was in 1985. However, experience with most ship (and other weapon system) programs indicates that although specific problems encountered in the past may not recur, different problems that will affect costs are likely to occur. In addition, the Navy states that the DD(X) will be more capable—and thus more complex—than the DDG-51 in several areas of warfare. If the first DD(X) cost the same amount to build on a per-ton basis as the first DDG-51, its price would total as much as $4.7 billion, CBO estimates, and the average cost per DD(X) for a 10-ship program would be about $3.5 billion.[4]

4. In making its calculations, CBO assumed that DD(X)s would be built by a single shipyard at a rate of one per year. If two shipyards built the class, and quantities did not increase, the cost per ship would be higher because larger overhead costs would be spread among the same number of ships. Conversely, if one shipyard built the DD(X) but at rates of more than one per year, the cost per ship would decline because the overhead burden of that shipyard would be shared by a larger number of ships in a year.

As an alternative, if the Congress decided to buy additional DDG-51s instead of the DD(X), their cost would average about $1.4 billion per ship (if two were built each year) or $1.2 billion (if three were built each year), CBO estimates.[5]

Comparing Life-Cycle Costs for the DDG-51 and DD(X)

Supporters of the DD(X) program have argued that although the ship is likely to have higher construction costs than existing destroyers, it will have lower operating costs because of its small crew and other efficiencies in its operation and support. In the past, supporters have also argued that the DD(X) would have lower total life-cycle costs than the DDG-51. A comparison of the two ship programs reveals, however, that although the DD(X) could have lower annual operating costs, its total life-cycle costs could still exceed those of an Arleigh Burke destroyer because of its higher construction costs.

According to the Navy's Visibility and Management of Operating and Support Costs (VAMOSC) database, a DDG-51 costs an average of $34 million per year to operate in 2007 dollars. The DD(X) is expected to have 63 percent fewer crew members than the DDG-51—125 instead of 340. At the same time, it is expected to be 55 percent heavier than the latest DDG-51s in terms of its full-load displacement. Thus, CBO assumed that the military personnel costs of a DD(X) would be 63 percent smaller than those of a DDG-51 (because of its smaller crew) but that the remaining costs of operating a DD(X) would be 55 percent larger than those of a DDG-51 (because of its greater full-load displacement and thus, for example, its higher annual fuel costs).

On the basis of those assumptions, CBO estimates that operating a DD(X) could cost about $32 million per year in 2007 dollars—essentially the same as a DDG-51. If, however, the potential effects of the DD(X)'s greater displacement are ignored (which might be appropriate if the Navy's plans to make the ship more efficient to operate are realized), and if operating costs other than personnel costs are assumed to equal those of the DDG-51, the $32 million estimate declines to $22 million per year (see Table 1).

Calculating the total life-cycle costs of the two types of destroyers requires discounting their respective operation and support (O&S) costs over the 35-year service life expected for a large surface combatant. Adding each ship's average procurement cost to its discounted O&S costs yields an estimate of total life-cycle costs of $2.1 billion in discounted dollars for a DDG-51 and $3.8 billion to $4.0 billion for a DD(X) (based on annual operating costs of $22 million to $32 million).

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5. The cost of buying just one DDG-51 each year would be about $1.8 billion, CBO estimates.

Those life-cycle estimates assume an average procurement cost of $1.4 billion for a DDG-51, if the ship was bought at a rate of two per year, and an average procurement cost of $3.3 billion for the DD(X) once it was in production, if that ship was purchased at a rate of one per year.[6] Using the Navy's average procurement cost of $2.2 billion for the DD(X) once in production would reduce that ship's life-cycle costs to $2.7 billion to $2.9 billion—still higher than those of the DDG-51. Those life-cycle figures exclude costs for research and development of the ships, for land-based infrastructure to support their operation, and for disposal after ships are taken out of service.[7]

Other factors could add to or subtract from the cost estimates presented here. Proposals to modernize DDG-51s by upgrading their combat systems, shrinking their crews, and lowering other operating costs could reduce the life-cycle costs of both existing Arleigh Burke destroyers and any DDG-51s built in the future. Such modernization, however, would have costs that would need to be incorporated into the life-cycle comparison. (Of course, the DD(X) is also likely to require modernization in the middle of its service life.)

In addition, if the Navy could make the DD(X) require less land-based support infrastructure than the DDG-51, the life-cycle costs of the DD(X) would be closer to those of the DDG-51 (even with the associated costs of that reduction included in the comparison). Conversely, if the DD(X) required a larger land-based infrastructure, its life-cycle costs would be higher than the estimates shown here. The ship might need a bigger land-based infrastructure to support its maintenance because its smaller onboard crew might not be able to perform as much ongoing maintenance during deployments as is the case with current Navy ships. (CBO does not have information about the costs of the land-based infrastructure that would be necessary to support the DD(X) class or that is used to support the DDG-51 class.)

Affordability of the DD(X) Relative to Recent Ship Construction Budgets

In 1985, the Navy's budget for ship construction and conversion totaled nearly $12 billion, equivalent to about $24 billion in 2007 dollars. At a cost of $1.2 billion (or almost $2.6 billion in 2007 dollars), the lead DDG-51 thus consumed nearly 11 percent of the Navy's shipbuilding budget for that year.

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6. The procurement cost of the DDG-51 used in that calculation represents what the Navy has paid for the ship in mature production at rates of two per year. For the DD(X), CBO used the average cost of ships three through 10, thus excluding the first two, which include detail-design costs.

7. The Navy estimates that research and development costs for the DD(X) will total more than $7 billion through 2011.

Since 2000, the service's ship construction budget has averaged about $11.8 billion in 2007 dollars. If shipbuilding budgets were held to that level in future years, the lead DD(X) would consume about 20 percent of such a budget, based on the $2.4 billion that the Navy has budgeted for it for 2007. (An additional $900 million is budgeted for that ship in 2005 and 2006.) If CBO's higher cost estimate ($3.8 billion, excluding the $900 million budgeted earlier) proved more realistic, the DD(X) would require more than 32 percent of an $11.8 billion shipbuilding budget, assuming the purchase of one DD(X) per year.

Affordability of the DD(X) Relative to Future Ship Construction Budgets

In April, CBO released a report requested by this Subcommittee that estimated the resources required to sustain a fleet of 260 or 325 ships.[8] That report concluded that sustaining the Navy's 260-ship plan would cost an average of $15.0 billion (in 2005 dollars) between 2006 and 2035, and sustaining the Navy's 325-ship plan would require about $18.3 billion. As noted above, the Navy has since provided CBO with an analysis of the inflation expected in the naval shipbuilding industry over the next five years. Such inflation is expected to be about 1.3 percent higher per year, on average, than the inflation anticipated for DoD's procurement programs overall.

In response to that new information, CBO has revised its projection of the resources needed to implement the Navy's 260- and 325-ship plans (see Figure 1). CBO assumed that inflation in ship construction would outpace inflation in DoD's overall procurement costs for the next 20 years, declining to the overall level of inflation thereafter. Under that assumption, sustaining the Navy's planned fleet would cost an average of $17.6 billion in 2005 dollars for 260 ships and $21.7 billion for 325 ships (or $18.7 billion and $22.9 billion, respectively, in 2007 dollars). Under those two plans, the Navy would spend about 20 percent of its average annual ship construction budget on large surface combatants—excluding the new, small littoral combat ships.

Considering only the DD(X), the Navy would spend about 3 percent of its shipbuilding budget on the new destroyer between 2006 and 2035 under the 260-ship

8. Congressional Budget Office, *Resource Implications of the Navy's Interim Report on Shipbuilding* (April 25, 2005). That report was written to evaluate the information provided in *An Interim Report to Congress on Annual Long-Range Plan for the Construction of Naval Vessels for FY2006*, submitted by Navy Secretary Gordon England to the Congress on March 23, 2005.

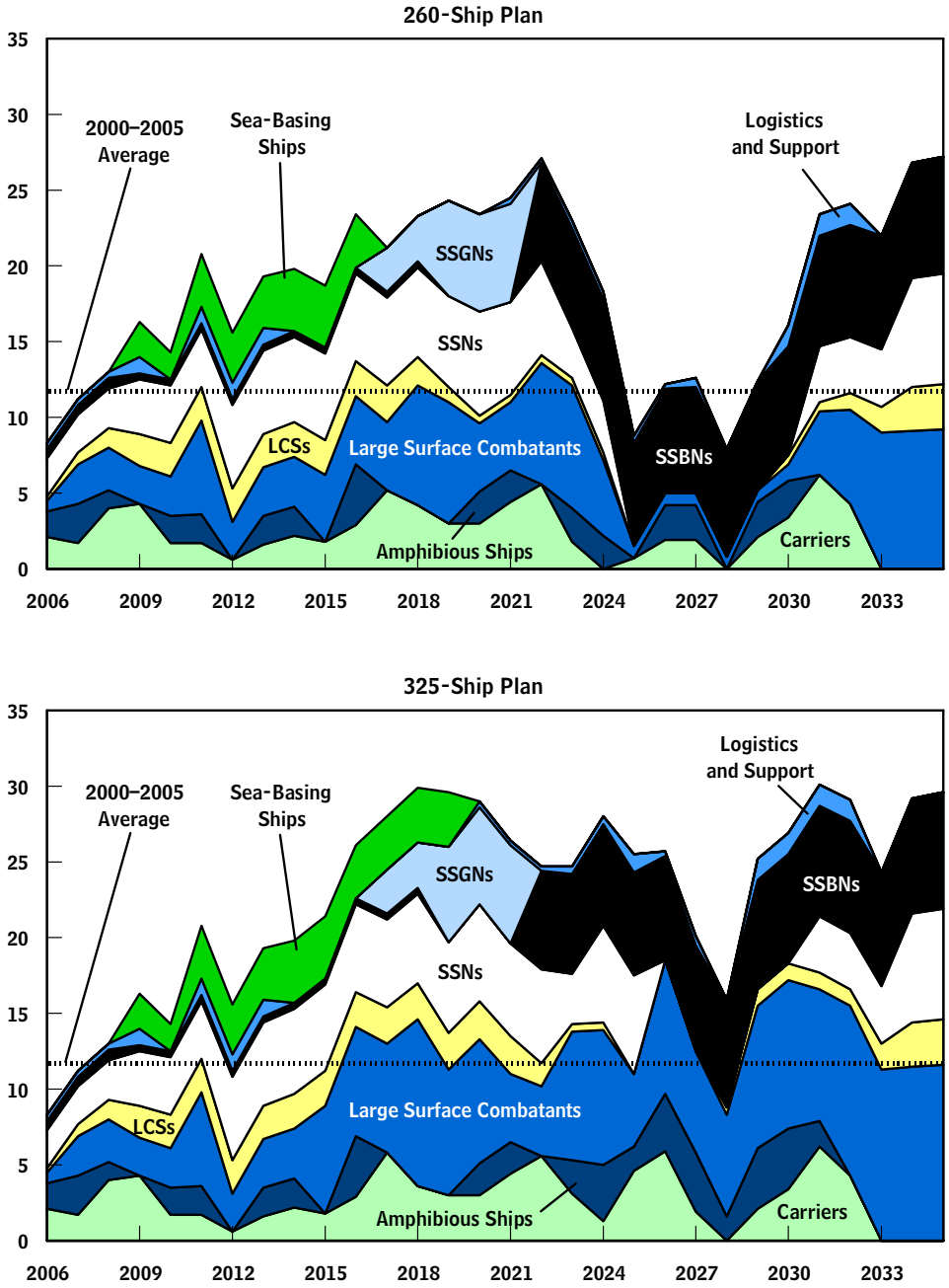
plan and about 4 percent under the 325-ship plan.[9] However, the 260-ship plan would require an average ship construction budget of $18.7 billion per year over that period, and the 325-ship plan would require $22.9 billion annually. Those figures are about 60 percent to 90 percent higher, respectively, than the average amount appropriated for ship construction between 2000 and 2005.

9. If one considers only the years in which the DD(X) would be purchased under those plans—2006 to 2018—the DD(X) would consume 9 percent or 13 percent, respectively, of the average annual ship construction budget for those years.

Figure 1.

Annual Costs Implied by the Navy's 260- and 325-Ship Plans

(Billions of 2007 dollars)



Source: Congressional Budget Office.

Notes: The data in this figure are similar to those published in Congressional Budget Office, *Resource Implications of the Navy's Interim Report on Shipbuilding* (April 25, 2005), but updated to use 2007 dollars and reflect higher expected inflation in the naval shipbuilding industry.

LCSs = littoral combat ships; SSNs = attack submarines; SSGNs = guided missile submarines; SSBNs = ballistic missile submarines.